

What's Happening in... Environmental Science

Autumn 2011

This newsletter describes research undertaken by environmental scientists at Lancaster who are examining the hazards associated with volcanic processes

Long-lived Lava Flows During Volcanic Eruptions

In areas around many volcanoes, infrastructure and livelihoods are often threatened by lava flows. During eruptions, one of the main problems for civil authorities is determining when to close facilities and which areas to evacuate. In order to provide advice, scientists run computer simulations of lava flows to try to determine in which direction, and how far, lava will travel. These computer simulations are combined with field measurements to validate the model outputs and to develop more advanced models in the future.

For short eruptions, the computer models simulate the advance of lava relatively accurately. However, during longer eruptions, when lava is erupted continuously for weeks or months, the lava flows develop complex features which have yet to be successfully modelled. Lava can flow in channels that branch or switch unpredictably. After a while, flows can also form a thick solid crust, allowing hot material to advance rapidly downhill in insulated lava tubes. These processes remain challenging to model and can result in flows that travel significantly further than initially anticipated.

Volcanologists at Lancaster are actively involved with the Istituto Nazionale di Geofisica e Vulcanologia (INGV), Italy, in research to understand the evolution of long-lived lava flow fields on Mount Etna, Sicily. Using combinations of thermal imagery, remote time-lapse photography and topographic data from laser scanners, researchers aim to build up a picture of some of the important processes controlling lava flows. Automated remote measurements not only capture observations of important transient events, such as channel switching, that are seldom witnessed by field workers, but also document gradual changes such as the cooling of flow surfaces as lava tubes develop. The results of the project will help to develop further the state-of-the-art computer models which INGV use to provide advice to the civil authorities in Italy during eruptions.

All of our environmental science degree programmes are built on strong links between our research and teaching activities. For example, students on some of our programmes have the opportunity to take part in a week-long fieldcourse to Mount Etna and see the flow fields described in this newsletter. Linking research and teaching in this way provides our students with skills and experience that are in high-demand among employers.

For more details about the reports above or about Environmental Science courses on offer at Lancaster University please contact the Environmental Science Admissions Staff, Lancaster Environment Centre, Lancaster University, LA1 4YQ, UK.
E-mail: lec.ug@lancaster.ac.uk or see our website: www.lec.lancs.ac.uk

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